

## **REMARKS**

Claims 1-55 are pending in the case and are rejected. Claims 1-7, 9-13, 16-20, 22, 25-29, 34-39, 42, 44-46, 49 and 54-55 are rejected under 35 U.S.C. §103(a) as being unpatentable over Ke et al. (U.S. Patent No. 6,658,264) and further in view of Feuerstein et al. (U.S. Patent No. 6,055,230). Claims 8, 21 and 30 are rejected under 35 U.S.C. §103(a) as being unpatentable over Ke et al. and Feuerstein et al. and further view of Reudink et al. (U.S. Patent No. 5,889,494). Claims 14-15, 23-24, 32-33, 40-41 and 47-48 are rejected under 35 U.S.C. §103(a) as being unpatentable over Ke et al. and Feuerstein et al. and further in view of Roberts et al. (U.S. Patent No. 4,845,504). Claims 15, 24, 33, 41 and 48 are rejected under 35 U.S.C. §103(a) as being unpatentable over Ke et al. and Feuerstein et al. and further in view of Keskitalo. Claims 31, 43, and 50-51 are rejected under 35 U.S.C. §103(a) as being unpatentable over Ke et al. and Feuerstein et al. and further in view of Struhsaker et al. (U.S. Patent No. 6,188,912).

## **SECTION 103(a) REJECTIONS**

The main group of claims rejected over the combination of Ke et al. and Feuerstein et al. includes claims 1-7, 9-13, 16-20, 22, 25-29, 34-39, 42, 44-46, 49, and 54-55. Of that group, claims 1, 16, 25, 34, 44, 49, 54, and 55 are independent. Each of these independent claims recites a system or method for wireless transmission or backhaul for sharing a cellular tower among multiple service providers. While the Ke et al. reference, cited as the main reference by the Examiner, has a similar purpose of sharing an antenna between two providers, it achieves that goal in an entirely different way from the present invention. In fact, the way that the goal of sharing a tower or

other antenna is handled in Ke et al. is so completely different from the present invention that a person of ordinary skill in the art would never be able to make or practice the claimed invention using the teachings of Ke et al. by itself or combined with one or more of the other cited references. Essentially, the Ke et al. reference provides RF processing (not digital processing) of the signals of two different providers and utilizes RF filtering components, in addition to the filtering offered by a duplexer and the linearity of a transmit amplifier, in order to minimize the interference from one provider to another, either inband or out of band with respect to the two service providers.

On the other hand, the present invention utilizes digital filtering to define individual portions of a digital band that correspond to service provider. More specifically, all the signals of the antenna or antenna structure, which are transmitted and received in a communication band, such as an RF band, include the signals of all of the service providers. There is no RF segregation as taught by Ke et al. Instead, with the invention, the RF signals are converted to a digital band. Digital filtering circuitry then defines individual portions of the digital band wherein the individual portions defined are directed to individual service providers. Signal processing circuitry for each of the individual providers is operable to process channel signals associated with the individual band portions defined for the individual service providers. There is absolutely no teaching or even a discussion of such digital filtering circuitry or digital filtering function in Ke et al.

Furthermore, in addition to digitally filtering a band to define individual digital band portions for individual service providers, the present invention utilizes digital signal processing circuitry to also define at least one individual beam for each individual service provider. That is also not discussed in Ke et al. While the Feuerstein et al.

reference is referred to for teaching multiple beam antennas, that reference also simply does beam selection to select the best beam for a particular purpose. It does not teach simultaneously driving an antenna with signal processing circuitry to define at least one beam for each individual service provider that shares an antenna. Furthermore, the Feuerstein et al. reference does not in any way discuss conversion of a communication frequency band (e.g., RF band) and all service provider signals thereon to a digital band, which is then digitally filtered to determine the signals for each service provider. In fact, there is no discussion of such a function in Feuerstein et al. Thus, the Feuerstein et al. reference fails to provide the teachings lacking in the Ke et al., such that any combination of the references would render obvious the present invention.

In short, Ke et al. and Feuerstein et al., alone and together, fall woefully short of teaching the present invention, much less even hinting at the present invention or rendering it obvious under §103 of the Patent Statute because those references do not teach limitations cited in the claims.

For clarity, claims 1, 16, and 25 have been amended to more specifically recite the digital filtering circuitry that processes the defined digital band, which includes the information from multiple service providers.

The method claim 54 clearly recites the conversion of a communication frequency band to a digital band, wherein portions of the digital band are assigned to multiple service providers. Claim 55 recites converter circuitry to define a digital band from the communication frequency band and utilization of signals processing circuitry for each of the multiple service providers to process individual digital band portions corresponding to the service providers and to simultaneously drive the antenna to define individual beams for the service providers. Such digital conversion of the

communication band (e.g., R.F. band) to a digital band, and filtering and processing of individual portions of the digital bands occurs prior to the signal being directed to the switching center or MSC or PSTN, as noted by the Examiner.

While the Examiner makes reference to digital filtering or digital processing in the cited references, it is not the digital filtering as claimed to define individual service providers. Specifically, in the Ke et al. reference, any digital processing of the signals takes place right before the RF signals are sent back to an MSC or PSTN, but after they have been segregated and directed to the individual RF circuitry of a provider. That is, there is no filtering of a digital band that contains all of the signals of the service providers in order to segregate or further process signals for specific providers. For example, Figure 2 in the Ke et al. reference shows first and second BTS wherein the combiner circuitry 150 through the combiner filters 152, 154 have segregated, at RF, the signals of the providers. The separate signals of the providers are sent to separate BTS's. There is no digital filtering used to do so. Therefore, further processing provided in the transmit and receive circuitry of each of the first and second BTS, does not in any way process signals of multiple providers or provide digital filtering circuitry for defining individual portions of a digital band associated with multiple providers. Rather, BTS 1 deals with signals for service provider 1 exclusively, and the same for BTS 2, which deals with signals for service provider 2 exclusively. Therefore, as noted above, the system taught in Ke et al. does not in any way teach segregating the signals of individual providers by digital filtering and defining individual portions of a large digital band that includes all the signals of the various providers. Instead, the RF filters and RF duplexers of Ke et al. handle such segregating as RF signals only.

Furthermore, because the signals are segregated essentially at the antenna rather than in a digital band, there is no signal processing taught by Ke et al. that simultaneously drives the antennas to define individual beams for the individual service providers. Accordingly, other than the Ke et al. reference and the present invention sharing a common goal of having service providers share some portion of an antenna, they could not be more different in their operation. As such, the Ke et al. reference as modified by Feuerstein et al. does not render obvious independent claims 1, 16, 25, 54 and 55 for the reasons discussed above.

The noted dependent claims 2-7, 9-13, 17-20, 22, and 26-29 each depend from one of the independent claims 1, 16 and 25, and thus include all the limitations therein. Accordingly, those claims would be allowable over the cited art for the same reasons as discussed above. However, each of those dependent claims further recites a unique combination of elements that is not taught by the cited references.

With respect to independent claims 34, 44 and 49, as noted by the Examiner, Ke et al. is silent regarding multiple beams for the multiple service providers. Furthermore, there is absolutely no teaching in Feuerstein et al. of generating individual beams for individual service providers for an array antenna. While Feuerstein et al. teaches the concept of multiple beams, those beams are not indicated as defined in a communication frequency band for individual service providers. Looking at the Ke et al. reference again, that reference merely teaches RF processing and segregation of signals and the utilization of filters and diplexers to prevent cross-communication when the signals are routed to a single antenna. A person of ordinary skill in the art would find absolutely no suggestion to somehow modify the reference of Ke et al. with Feuerstein et al., or vice versa, to yield the present invention. There is absolutely no

discussion in Ke et al. as to how the antenna 180 might be utilized for different service providers by utilizing multiple beams. Furthermore, there is no suggestion in Feuerstein et al. to a person of ordinary skill in the art as to how Feuerstein et al. would improve upon the RF signal segregation provided by the Ke et al. A person of ordinary skill in the art does not operate in the abstract, or in a vacuum where hindsight pieces and components of an invention might somehow be thrown together. Rather, such a person requires some kind of motivation or teaching between the two references to somehow even combine them. Currently, they are so completely different that there is no suggestion to do so, and even if there was a motivation to combine, there would still be no distinct teaching of how to even modify Ke et al. with the teaching of Feuerstein et al.

The present invention, on the other hand, takes advantage of the utilization of a digital conversion in the entire band. Through selective digital filtering, individual portions of the digital band can be carved out for each of the individual service providers. Furthermore, the signal processing circuitry utilized to process the individual band portions also is utilized to define individual beams for each of the individual service providers. This is unique, and certainly not obvious, over the prior art.

Accordingly, claims 34-39, 42, 44-46 and 49 are allowable over the cited art. With respect to the various dependent claims pending, the Examiner appears to be merely finding various pieces without any context regarding the overall teaching of the references.

For example, regarding claim 4, the Examiner simply finds a multiplexor circuit (MUX) component in Figure 2 of Feuerstein et al. and states it would be obvious to somehow utilize such a digital multiplexor to duplicate signals of the digital band from

multiple service providers. This is merely a conclusion and has no support in the cited reference. The multiplexor used in Feuerstein et al. serves a different purpose than the claimed invention's multiplexor. Such a MUX would essentially have no purpose because Ke et al. segregates signals at RF. Similarly, the rejections of claims 5-7, 10-13, 18-20, 22, 27-29, 36-39, 42 and 46 are handled in a similar fashion, wherein the Examiner simply finds some block or element and concludes that Ke et al. and Feuerstein et al. might somehow be re-configured to yield the invention. For the reasons previously noted, such conclusions are simply wrong due to the distinctive natures of Ke et al., Feuerstein et al., and the present invention.

Furthermore, with respect to claim 9, the Examiner could not find any reference and thus mentions a conclusory Official Notice with respect to the claim limitation. This unsupported rationale is also not sufficient under §103 to render claim 9 obvious.

Claims 8, 21 and 30 are rejected over Ke et al./Feuerstein et al., as also modified by Reudink et al. The Reudink et al. reference is recited for defining individual sectors or beams oriented in different directions. As such, the Applicant submits that Reudink et al. also fails to provide the teaching lacking in Ke et al./Feuerstein et al., such that claims 8, 21 and 30 would be rendered obvious for the reasons noted above. Those claims are, therefore, allowable over the cited art.

Similarly, claims 14-15, 23-24, 32-33, 40-41 and 47-48 are rejected over Ke et al./Feuerstein et al. as modified by Roberts et al. The Examiner cites to Roberts et al. for a beam steering concept. As such, the Roberts et al. reference also fails to provide teaching that is lacking in the Ke et al./Feuerstein et al. base references. Thus, claims 14-15, 23-24, 32-33, 40-41 and 47-48 are not obvious over the cited art.

Claims 15, 24, 33, 41 and 48 are rejected over a combination of Ke et al./Feuerstein et al. as modified by Keskitalo. However, no such Keskitalo reference is noted. The Examiner actually refers to the Roberts et al. reference in the Office Action but, as noted above, the Ke et al./Feuerstein et al./Roberts et al. combination does not render obvious the base independent claims and, thus, it cannot render obvious the dependent claims. Therefore, claims 15, 24, 33, 41 and 48 are allowable over the cited art.

Claims 31, 43 and 50-51 are rejected over Ke et al./Feuerstein et al./Struhsaker. As near as the Applicant can tell, the Examiner cites to Struhsaker merely because the reference mentions microwave backhaul. However, that reference does not provide any of the teaching lacking in Ke et al./Feuerstein et al. as base references, such that the combination of those references with Struhsaker would somehow render obvious claims 31, 43 and 50-51. Therefore, those claims are allowable over the cited art.

Finally, the Examiner resorts to four different references for rejecting claims 52-53 under §103(a). Those four references include Ke et al./Feuerstein et al./Roberts et al./Struhsaker. Each of claims 52 and 53 depends from claim 49, which is allowable over the cited art for the reasons discussed above. The Examiner turns to the Roberts et al. and Struhsaker references for teaching the individual component of microwave backhaul and beam steering. However, the mere existence of those concepts, unrelated to the present invention, does not provide any teaching to a person of ordinary skill in the art, such that the four-reference combination cited somehow renders the invention obvious as claimed in claims 52-53. There is no teaching whatsoever to somehow combine the references, nor is there any suggestion as to how



these references might even be combined. Accordingly, claims 52 and 53 are allowable over the prior art.

## CONCLUSION

Applicant submits that the currently pending claims are in an allowable form and, therefore, requests a Notice of Allowability of the application at the Examiner's earliest convenience. If any issues remain in the case which might be handled in an expedited fashion, such as through a telephone call or an Examiner's Amendment, the Examiner is certainly encouraged to telephone the Applicant's representative or to issue an Examiner's Amendment.

Applicant encloses a check in the amount of \$110.00 for a one month extension of time to submit a Response herein. The Applicant knows of no additional fees due with this submission. However, if any charges or credits are necessary, please apply them to Deposit Account 23-3000.

Respectfully submitted,

WOOD, HERRON & EVANS, L.L.P.



Kurt A. Summe  
Reg. No. 36,023

2700 Carew Tower  
Cincinnati OH 45202  
(513) 241-2324 (voice)  
(513) 421-7269 (facsimile)

### **Drawing Objections**

In response to the Examiner's drawing objections, we include a new Figure 1 to indicate the –Prior Art– status of Figure 1. This should address the Examiner's concerns.